Annals of Neurology

Vol 42 July / December 1997

Official Journal of the American Neurological Association and the Child Neurology Society

Editor
Richard T. Johnson, MD
The Johns Hopkins University
Baltimore

Founding Editor, 1977–1984
Fred Plum, MD

Editor, 1985–1992
Arthur K. Asbury, MD

Editor, 1993–1997
Robert A. Fishman, MD

Associate Editors
Ralph W. Kuncl, MD, PhD
Baltimore
David Zee, MD
Baltimore

Associate Editor for Child Neurology
Joseph J. Volpe, MD, Boston

Managing Editor
Sheila Rose Garrity, MS

Publisher
Lippincott-Raven Publishers
Philadelphia, Pennsylvania

Publishing Staff
Marcia Serepy, Executive Publisher
Grace R. Caputo, Production Editor
Nicholas Minicucci Jr, Publishing Co, Inc, Advertising Representative
Martin Stevens, Special Sales

Editorial Board
M. Flint Beal, MD, Boston
Thomas D. Bird, MD, Seattle
Robert C. Collins, MD, Los Angeles
David R. Cornblath, MD, Baltimore
Jasper R. Daube, MD, Rochester, MN
Kenneth H. Fischbeck, MD, Philadelphia
Richard S. J. Frackowiak, MD, London
Kirk A. Frey, MD, PhD, Ann Arbor
David A. Greenberg, MD, PhD, Pittsburgh
Stephen L. Hauser, MD, San Francisco
Gregory L. Holmes, MD, Boston
Edward H. Koo, MD, Boston
Bruce R. Korf, MD, PhD, Boston
Richard P. Mayeux, MD, New York
Henry F. McFarland, MD, Bethesda
Jerry R. Mendell, MD, Columbus, OH
John G. Nutt, MD, Portland, OR
Peter C. O'Brien, PhD, Rochester, MN
John B. Penney, Jr, MD, Boston
Alan K. Percy, MD, Birmingham
Ronald C. Petersen, MD, PhD, Rochester, MN
Louis J. Ptáček II, MD, Salt Lake City
Ronald J. Tusa, MD, PhD, Miami
Takehiko Yanagihara, MD, Osaka, Japan

Annals of Neurology *(ISSN 0364-5134) is published monthly for the American Neurological Association by Lippincott-Raven Publishers, 12107 Insurance Way, Hagerstown, MD 21740. Business offices are located at 227 East Washington Square, Philadelphia, PA 19106-3780. Periodicals postage paid at Hagerstown, MD, and at additional mailing offices.*

Copyright © 1997 by the American Neurological Association. All rights reserved. Except as authorized in the accompanying statement, no part of Annals of Neurology *may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without the publisher's written permission. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by the American Neurological Association for libraries and other users registered with the Copyright Clearance Center Transactional Reporting Service, provided that the per-copy fee of $5.00 is paid directly to the Copyright Clearance Center, 27 Congress St, Salem, MA 01970, for copying beyond that permitted by Sections 107 and 108 of the U.S. Copyright Law. The code fee for this journal is 0364-5134/97 $5.00. This authorization does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copying fees for material published in this journal prior to January 1, 1978, will be charged according to the fee rates on file with the Copyright Clearance Center, Inc.*

Annals of Neurology *is indexed in* Index Medicus, Current Contents/Clinical Medicine, Excerpta Medica, Biological Abstracts, and Psychological Abstracts.

Address for subscription information, orders, or changes of address *(except Japan): 12107 Insurance Way, Hagerstown, MD 21740; tel: 800-638-3030; fax: 301-824-7390; in Maryland, call collect, 301-714-2300. In Japan, contact MEDSI, 1-2-13 Yushima, Bunkyo-ku, Tokyo 113, Japan.* ***Annual subscription rates:*** *U.S.: $190.00 individual, $296.00 institution, $130 special resident rate; Canada/Mexico: $259.00 individual, $425.00 institution. (The Canadian GST Tax of 7% will be added to all orders shipped to Canada. Lippincott-Raven Publishers' GST Identification Number is 130876246.) Canada Post International Publications Mail Product Sales Agreement #: 1119699. All other countries (except Japan): $259.00 individual, $425.00 institution. (Prices outside North America include $15.00 for air freight shipping—delivery within 7 to 21 days worldwide.) International subscriptions must be prepaid. Please add $4.00 to all rates above for handling. Single copies, when available, may be ordered from the publisher for $38.00. Prices subject to change without notice. Copies will be replaced without charge if the publisher receives a request within 90 days of the mailing date, both in the U.S. and worldwide.*

POSTMASTER: *Send address changes to* Annals of Neurology, *P.O. Box 1550, Hagerstown, MD 21740.*

Lippincott - Raven
PUBLISHERS

NO 1 JULY 1997

Message from the Editor

1 *Richard T. Johnson, MD*

Notice

2 **Ad Hoc Reviewers**

Neurological Progress

3 **Rett Syndrome: A Disorder Affecting Early Brain Growth**
SakkuBai Naidu, MD

Original Articles

11 **The Clinical Syndrome of Early-Life Bilateral Hippocampal Sclerosis**
G. Robert DeLong, MD, and E. Ralph Heinz, MD

18 **Cytokine Profile of Myelin Basic Protein–Reactive T Cells in Multiple Sclerosis and Healthy Individuals**
Guy Hermans, MS, Piet Stinissen, PhD, Lysiane Hauben, MS, Ella Van den Berg-Loonen, PhD, Jef Raus, MD, PhD, and Jingwu Zhang, MD, PhD

28 **Association of *Campylobacter jejuni* Serotype with Antiganglioside Antibody in Guillain-Barré Syndrome and Fisher's Syndrome**
Nobuhiro Yuki, MD, PhD, Masaki Takahashi, Yumi Tagawa, MD, Kouichi Kashiwase, Kenji Tadokoro, MD, PhD, and Kahiko Saito

34 **Accumulation of β-Amyloid Precursor Protein in HIV Encephalitis: Relationship with Neuropsychological Abnormalities**
Bruno Giometto, MD, Shu F. An, MD, Mike Groves, BSc, Tomaso Scaravilli, MD, Jennian F. Geddes, MBBS, FRCPath, Robert Miller, MBBS, FRCP, Bruno Tavolato, MD, Andrew A. J. Beckett, FIBMS, and Francesco Scaravilli, MD, PhD, FRCPath

41 **Extensive DNA Deletion Associated with Severe Disease Alleles on Spinal Muscular Atrophy Homologues**
Ching H. Wang, MD, PhD, Todd A. Carter, MS, Kamna Das, PhD, Jin Xu, MD, Barbara M. Ross, MS, Graciela K. Penchaszadeh, MA, and T. Conrad Gilliam, PhD

50 **Magnetic Resonance Imaging in Classification of Congenital Muscular Dystrophies with Brain Abnormalities**
M. S. van der Knaap, MD, PhD, L. M. E. Smit, MD, PhD, P. G. Barth, MD, PhD, C. E. Catsman-Berrevoets, MD, PhD, O. F. Brouwer, MD, PhD, J. H. Begeer, MD, PhD, I. F. M. de Coo, MD, and J. Valk, MD, PhD

60 **Intrinsic Epileptogenesis of Hypothalamic Hamartomas in Gelastic Epilepsy**
Ruben Kuzniecky, MD, Barthon Guthrie, MD, James Mountz, MD, PhD, Martina Bebin, MD, Edward Faught, MD, Frank Gilliam, MD, and Hong-Gang Liu, PhD

68 **Circulating Tumor Necrosis Factor-α Correlates with Electrodiagnostic Abnormalities in Guillain-Barré Syndrome**
M. K. Sharief, MD, PhD, MRCP, D. A. Ingram, BSc, MB, and M. Swash, MD, FRCP, FRCPath

74 **Multiple Sclerosis: Oligodendrocytes Display Cell Death–Related Molecules In Situ But Do Not Undergo Apoptosis**
Bruno Bonetti, MD, and Cedric S. Raine, PhD, DSc, FRCPath

85 **Metabolic Reduction in the Posterior Cingulate Cortex in Very Early Alzheimer's Disease**
Satoshi Minoshima, MD, PhD, Bruno Giordani, PhD, Stanley Berent, PhD, Kirk A. Frey, MD, PhD, Norman L. Foster, MD, and David E. Kuhl, MD

95 **Short- and Long-Term Survival and Function of Unilateral Intrastriatal Dopaminergic Grafts in Parkinson's Disease**
Gregor K. Wenning, MD, PhD, Per Odin, MD, PhD, Paul Morrish, BM, Stig Rehncrona, MD, PhD, Håkan Widner, MD, PhD, Patrik Brundin, MD, PhD, John C. Rothwell, PhD, Richard Brown, PhD, Björn Gustavii, MD, PhD, Peter Hagell, RN, Marjan Jahanshahi, PhD, Guy Sawle, MD, Anders Björklund, PhD, David J. Brooks, MD, FRCP, C. David Marsden, DSc, FRS, Niall P. Quinn, MD, and Olle Lindvall, MD, PhD

Brief Communications

108 **Presenilin-1 Polymorphism and Hereditary Cerebral Hemorrhage with Amyloidosis, Dutch Type**
M. Bornebroek, MD, J. Haan, MD, PhD, H. Backhovens, P. Deutz, M. A. Van Buchem, MD, PhD, M. van den Broeck, E. Bakker, PhD, R. A. C. Roos, MD, PhD, and C. Van Broeckhoven, PhD

111 **Sporadic Focal Dystonia in Northwest Germany: Molecular Basis on Chromosome 18p**
B. Leube, T. Hendgen, K. R. Kessler, M. Knapp, R. Benecke, and G. Auburger

115 **α_1-Antichymotrypsin as a Risk Modifier for Late-Onset Alzheimer's Disease in Japanese Apolipoprotein E ε4 Allele Carriers**
A. Yoshiiwa, MD, K. Kamino, MD, PhD, H. Yamamoto, MD, PhD, T. Kobayashi, MD, PhD, M. Imagawa, MD, PhD, Y. Nonomura, MD, PhD, H. Yoneda, MD, PhD, T. Sakai, MD, PhD, Y. Nishiwaki, MD, N. Sato, MD, H. Rakugi, MD, PhD, T. Miki, MD, PhD, and T. Ogihara, MD, PhD

117 **Selective Vestibular Damage in Neurosarcoidosis**
M. von Brevern, MD, T. Lempert, MD, A. M. Bronstein, MD, PhD, and R. Kocen, FRCP

120 **Polymerase Chain Reaction–Based Detection of *Tropheryma whippelii* in Central Nervous System Whipple's Disease**
T. Lynch, MRCPI, J. Odel, MD, D. N. Fredericks, MD, E. D. Louis, MD, MS, S. Forman, MD, H. Rotterdam, MD, S. Fahn, MD, and D. A. Relman, MD

124 **Early-Onset Alzheimer's Disease with a Presenilin-1 Mutation at the Site Corresponding to the Volga German Presenilin-2 Mutation**
Richard Crook, BSc, Ronald Ellis, MD, Megan Shanks, MD, Leon J. Thal, MD, Jordi Perez-Tur, PhD, Matt Baker, BSc, Mike Hutton, PhD, Tuomas Haltia, PhD, John Hardy, PhD, and Douglas Galasko, MD

Letters

129 **Levodopa-Inhibiting Effect of Pallidal Surgery**
P. Krack, MD, P. Pollak, MD, P. Limousin, MD, and A. L. Benabid, MD, PhD

129 **Reply**
Mark S. Baron, MD, Jerrold L. Vitek, MD, Roy A. E. Bakay, MD, Joanne Green, PhD, Yoshiki Kaneoke, MD, Takao Hashimoto, MD, Robert S. Turner, PhD, John L. Woodard, PhD, Steven A. Cole, MD, William M. McDonald, MD, and Mahlon R. DeLong, MD

130 **Copper and Zinc Levels in Familial Amyotrophic Lateral Sclerosis Patients with CuZnSOD Gene Mutations**
A. Radunović, MD, PhD, H. T. Delves, PhD, W. Robberecht, MD, PhD, P. Tilkin, RN, Z. E. Enayat, MSc, C. E. Shaw, FRACP, Z. Stević, MD, PhD, S. Apostolski, MD, PhD, J. F. Powell, DPhil, and P. N. Leigh, PhD, FRCP

131 **Acute Myopathy of Intensive Care**
Nicola Latronico, MD

132 **Reply**
David Lacomis, MD, and Michael J. Giuliani, MD

Regular Departments

133 **Books**

NO 2 AUGUST 1997

Point of View

135 **Do Posttranslational Modifications of CuZnSOD Lead to Sporadic Amyotrophic Lateral Sclerosis?**
Dale E. Bredesen, MD, Lisa M. Ellerby, PhD, P. John Hart, PhD, Martina Wiedau-Pazos, MD, PhD, and Joan Selverstone Valentine, PhD

Original Articles

138 **Familial Spongiform Encephalopathy Associated with a Novel Prion Protein Gene Mutation**
Ricardo Nitrini, MD, Sergio Rosemberg, MD, Maria Rita Passos-Bueno, PhD, Luís S. Teixeira da Silva, MD, Paula Iughetti, BSc, Maria Papadopoulos, BSc, Paulo M. Carrilho, MD, Paulo Caramelli, MD, Steffen Albrecht, MD, Mayana Zatz, PhD, and Andrea LeBlanc, PhD

147 **Effect of Lambert-Eaton Myasthenic Syndrome Antibodies on Autonomic Neurons in the Mouse**
Sally A. Waterman, PhD, Bethan Lang, PhD, and John Newsom-Davis, FRS

159 **Nicotinic Receptor Stimulation Protects Neurons Against β-Amyloid Toxicity**
T. Kihara, MD, S. Shimohama, MD, PhD, H. Sawada, MD, J. Kimura, MD, T. Kume, MS, H. Kochiyama, MS, T. Maeda, MS, and A. Akaike, PhD

164 **Ischemic Lesion Volumes in Acute Stroke by Diffusion-Weighted Magnetic Resonance Imaging Correlate with Clinical Outcome**
Karl-Olof Lövblad, MD, Alison E. Baird, MD, PhD, Gottfried Schlaug, MD, Andrew Benfield, BS, Bettina Siewert, MD, Barbara Voetsch, MD, Ann Connor, RN, Cara Burzynski, RN, Robert R. Edelman, MD, and Steven Warach, MD, PhD

171 **Quantitative Assessment of Cardiovascular Autonomic Function in Guillain-Barré Syndrome**
P. Flachenecker, MD, P. Wermuth, H.-P. Hartung, MD, and K. Reiners, MD

180 **Association of Myopathy with Large-Scale Mitochondrial DNA Duplications and Deletions: Which Is Pathogenic?**
Giovanni Manfredi, Tuan Vu, Eduardo Bonilla, Eric A. Schon, Salvatore DiMauro, Enrica Arnaudo, Lee Zhang, Lewis P. Rowland, and Michio Hirano

189 **Otolith–Ocular Responses in Familial Episodic Ataxia Linked to Chromosome 19p**
Joseph M. Furman, MD, PhD

194 **Hippocampal *N*-Acetylaspartate in Neocortical Epilepsy and Mesial Temporal Lobe Epilepsy**
Peter Vermathen, Dr rer nat, Gabriele Ende, Dr rer nat, Kenneth D. Laxer, MD, Robert C. Knowlton, MD, Gerald B. Matson, PhD, and Michael W. Weiner, MD

200 **Calcium-Permeable α-Amino-3-Hydroxy-5-Methyl-4-Isoxazole Propionic Acid Receptors: A Molecular Determinant of Selective Vulnerability in Amyotrophic Lateral Sclerosis**
T. L. Williams, MRCP, N. C. Day, PhD, P. G. Ince, MRCPath, R. K. Kamboj, PhD, and P. J. Shaw, FRCP

208 **Glial Cell Line–Derived Neurotrophic Factor–Levodopa Interactions and Reduction of Side Effects in Parkinsonian Monkeys**
Yasuyuki Miyoshi, MD, Zhiming Zhang, MD, Aliza Ovadia, BS, Paul A. Lapchak, PhD, Frank Collins, PhD, Dana Hilt, MD, Carl Lebel, PhD, Richard Kryscio, PhD, Don M. Gash, PhD

215 **Dopamine D_1 and D_2 Receptor Gene Expression in the Striatum in Huntington's Disease**
S. J. Augood, PhD, R. L. M. Faull, PhD, DSc, and P. C. Emson, PhD

222 **A Biochemical, Genetic, and Clinical Survey of Autosomal Recessive Limb Girdle Muscular Dystrophies in Turkey**
Pervin Dinçer, PhD, France Leturcq, PhD, Isabelle Richard, PhD, Federica Piccolo, MS, Dilek Yalnızoğlu, MD, Claudia de Toma, MS, Zuhal Akçören, MD, Odile Broux, BS, Nathalie Deburgrave, BA, Lydie Brenguier, BA, Carinne Roudaut, BA, J. Andoni Urtizberea, MD, Daniel Jung, PhD, Ersin Tan, MD, Marc Jeanpierre, MD, PhD, Kevin P. Campbell, PhD, Jean-Claude Kaplan, MD, PhD, Jacques S. Beckmann, PhD, and Haluk Topaloğlu, MD

230 **Reduced *TSC2* RNA and Protein in Sporadic Astrocytomas and Ependymomas**
Ralf Wienecke, MD, Abhijit Guha, MD, John C. Maize, Jr, BS, Richard L. Heideman, MD, Jeffrey E. DeClue, PhD, and David H. Gutmann, MD, PhD

236 **The Impact of Inpatient Rehabilitation on Progressive Multiple Sclerosis**
J. A. Freeman, BAppSci, D. W. Langdon, PhD, J. C. Hobart, MRCP, and A. J. Thompson, FRCP

Brief Communications

245 **Long-Duration Response to Levodopa Influences the Pharmacodynamics of Short-Duration Response in Parkinson's Disease**
Mario Zappia, MD, Rosanna Colao, MD, Rita Montesanti, MD, Milena Rizzo, PhD, Umberto Aguglia, MD, Antonio Gambardella, MD, Rosario Luciano Oliveri, MD, and Aldo Quattrone, MD

249 **X-Linked Emery-Dreifuss Disease Can Be Diagnosed from Skin Biopsy or Blood Sample**
M. Mora, PhD, L. Cartegni, PhD, C. Di Blasi, MS, R. Barresi, MS, S. Bione, PhD, M. Raffaele di Barletta, L. Morandi, MD, L. Merlini, MD, V. Nigro, MD, L. Politano, MD, M. A. Donati, MD, F. Cornelio, MD, F. Cobianchi, PhD, and D. Toniolo, PhD

253 **A Proposed Mutation, Val78Il3, Associated with Kyperkalemic Periodic Paralysis and Cardiac Dyrhythmia Is a Benign Polymorphism**
Donnella S. Green, BA, Lawrence J. Hayward, MD, PhD, Alfred L. George, Jr, MD, and Stephen C. Cannon, MD, PhD

Regular Departments

256 **Maternally Inherited Encephalopathy Associated with a Single-Base Insertion in the Mitochondrial $tRNA^{Trp}$ Gene**
F. M. Santorelli, MD, K. Tanji, MD, M. Sano, PhD, S. Shanske, PhD, M. El-Shahawi, MD, P. Kranz-Eble, BS, S. DiMauro, MD, and D. C. De Vivo, MD

261 **Coenzyme Q_{10} Levels Correlate with the Activites of Complexes I and II/III in Mitochondria from Parkinsonian and Nonparkinsonian Subjects**
Clifford W. Shults, MD, Richard H. Haas, MB, BChir, David Passov, BS, and M. Flint Beal, MD

Expedited Publication

265 **Frataxin Gene of Friedreich's Ataxia Is Targeted to Mitochondria**
Josef Priller, MD, Clemens R. Scherzer, MD, Peter W. Faber, PhD, Marcy E. MacDonald, PhD, and Anne B. Young, MD, PhD

Letters

270 **Could a Herpesvirus Mimic Tacrolimus-Induced Leukoencephalopathy?**
David L. Paterson, MD, Timothy Gayowski, MD, and Nina Singh, MD

270 **Reply**
Steven L. Small, MD, PhD, and Benjamin H. Eidelman, MD, PhD

270 **Tuberin Loss from Cerebral Tissues**
Harry V. Vinters, MD, Christopher Kerfoot, BS, and Jessica K. Emelin, MS

271 **Reply**
Masashi Mizuguchi, MD, and Sachio Takashima, MD

272 **Bilateral Parasagittal Parietooccipital Polymicrogyria and Epilepsy**
Ana Sotrel, MD

272 **Reply**
R. Guerrini, MD, F. Dubeau, MD, O. Dulac, MD, A. J. Barkovich, MD, R. Kuzniecky, MD, C. Fett, MD, M. Jones-Gotman, PhD, R. Canapicchi, MD, H. Cross, MD, D. Fish, MD, P. Bonanni, MD, I. Jambaqué MD, and F. Andermann, MD

273 **CuZnSOD-Associated Amyotrophic Lateral Sclerosis**
Aleksandar Radunović, MD, PhD, Christopher E. Shaw, FRACP, Gülşen Akman-Demir, MD, H. Idrisoglu, MD, and P. Nigel Leigh, PhD, FRCP

274 **Reply**
Merit E. Cudkowicz, MD, and Robert H. Brown, MD, PhD

NO 3 SEPTEMBER 1997

Neurological Progress

275 **Calcium Channels in Neurological Disease**
David A. Greenberg, MD, PhD

Original Articles

283 **Changes in Cerebral Activity Pattern Due to Subthalamic Nucleus or Internal Pallidum Stimulation in Parkinson's Disease**
Patricia Limousin, MD, John Greene, MD, Pierre Pollak, MD, John Rothwell, PhD, Alim-Louis Benabid, MD, PhD, and Richard Frackowiak, MD, DSc

292 **High-Frequency Unilateral Thalamic Stimulation in the Treatment of Essential and Parkinsonian Tremor**
William Koller, MD, PhD, Rajesh Pahwa, MD, Karen Busenbark, BSN, Jean Hubble, MD, Steve Wilkinson, MD, Anthony Lang, MD, Paul Tuite, MD, Elspeth Sime, RN, Andres Lozano, MD, PhD, Robert Hauser, MD, Teresita Malapira, BSN, Donald Smith, MD, Daniel Tarsy, MD, Edison Miyakawi, MD, Thorkild Norregaard, MD, Theresa Kormos, MSN, and C. Warren Olanow, MD

300 **Central Levodopa Metabolism in Parkinson's Disease after Administration of Stable Isotope–Labeled Levodopa**
Raymon Durso, MD, James E. Evans, Ephraim Josephs, George K. Szabo, BS, Barbara A. Evans, BS, Joseph S. Handler, MD, Dana Jennings, MD, and Thomas R. Browne, MD

305 **Andersen's Syndrome: A Distinct Periodic Paralysis**
V. Sansone, MD, R. C. Griggs, MD, G. Meola, MD, L. J. Ptáček, MD, R. Barohn, MD, S. Iannaccone, MD, W. Bryan, MD, N. Baker, MD, S. J. Janas, MD, W. Scott, MD, D. Ririe, BA, and R. Tawil, MD

313 **Immune Deviation Following Pulse Cyclophosphamide/Methylprednisolone Treatment of Multiple Sclerosis: Increased Interleukin-4 Production and Associated Eosinophilia**
Derek R. Smith, Konstantin E. Balashov, David A. Hafler, Samia J. Khoury, and Howard L. Weiner

319 **Apolipoprotein E Genotypes in a Neuropathological Series from the Consortium to Establish a Registry for Alzheimer's Disease**
Kathleen A. Welsh-Bohmer, PhD, Marla Gearing, PhD, Ann M. Saunders, PhD, Allen D. Roses, MD, and Suzanne Mirra, MD

326 **Increased 3-Nitrotyrosine and Oxidative Damage in Mice with a Human Copper/Zinc Superoxide Dismutase Mutation**
Robert J. Ferrante, PhD, Leslie A. Shinobu, MD, PhD, Jörg B. Schulz, MD, Russell T. Matthews, BS, Craig E. Thomas, PhD, Neil W. Kowall, MD, Mark E. Gurney, PhD, and M. Flint Beal, MD

335 **Hypoxia–Ischemia Causes Abnormalities in Glutamate Transporters and Death of Astroglia and Neurons in Newborn Striatum**
Lee J. Martin, PhD, Ansgar M. Brambrink, MD, Christoph Lehmann, MD, Carlos Portera-Cailliau, BS, Raymond Koehler, PhD, Jeffrey Rothstein, MD, PhD, and Richard J. Traystman, PhD

349 **Short- and Long-Duration Responses to Levodopa During the First Year of Levodopa Therapy**
John G. Nutt, MD, Julie H. Carter, RN, MN, ANP, Laura Van Houten, BA, and William R. Woodward, PhD

Brief Communications

356 **Pathological τ Proteins in Postencephalitic Parkinsonism: Comparison with Alzheimer's Disease and Other Neurodegenerative Disorders**
Valérie Buée-Scherrer, PhD, Luc Buée, PhD, Béatrice Leveugle, PhD, Daniel P. Perl, MD, Patrick Vermersch, MD, PhD, Patrick R. Hof, MD, and André Delacourte, PhD

360 **The X-Linked Infantile Spasms Syndrome (MIM 308350) Maps to Xp11.4–Xpter in Two Pedigrees**
S. Claes, MD, K. Devriendt, MD, PhD, L. Lagae, MD, PhD, B. Ceulemans, MD, L. Dom, MD, P. Casaer, MD, PhD, P. Raeymaekers, PhD, J. J. Cassiman, MD, PhD, and J. P. Fryns, MD, PhD

364 **Congenital Axonal Neuropathy Caused by Deletions in the Spinal Muscular Atrophy Region**
R. Korinthenberg, MD, M. Sauer, MD, U.-P. Ketelsen, MD, C. O. Hanemann, MD, G. Stoll, MD, M. Graf, MD, A. Baborie, MD, B. Volk, MD, B. Wirth, PhD, S. Rudnik-Schöneborn, MD, and K. Zerres, MD

368 **Human Immunodeficiency Virus Infection of Dorsal Root Ganglion Neurons Detected by Polymerase Chain Reaction In Situ Hybridization**
Thomas H. Brannagan III, MD, Gerard J. Nuovo, MD, Arthur P. Hays, MD, and Norman Latov, MD, Ph

372 **Factor V Leiden Mutation: An Unrecognized Cause of Hemiplegic Cerebral Palsy, Neonatal Stroke, and Placental Thrombosis**
Olafur Thorarensen, MD, Stephen Ryan, MD, Jill Hunter, MD, and Donald P. Younkin, MD

376 **Apolipoprotein E ε2 Does Not Increase Risk of Early-Onset Sporadic Alzheimer's Disease**
W. K. Scott, PhD, A. M. Saunders, PhD, P. C. Gaskell, PA-C, P. A. Locke, BA, J. H. Growdon, MD, L. A. Farrer, PhD, S. A. Auerbach, MD, A. D. Roses, MD, J. L. Haines, PhD, and M. A. Pericak-Vance, PhD

Special Report

379 **Recommendations from the National Multiple Sclerosis Society Clinical Outcomes Assessment Task Force**
Richard Rudick, MD, Jack Antel, MD, Christian Confavreux, MD, Gary Cutter, PhD, George Ellison, MD, Jill Fischer, PhD, Fred Lublin, MD, Aaron Miller, MD, John Petkau, PhD, Stephen Rao, PhD, Stephen Reingold, PhD, Karl Syndulko, PhD, Alan Thompson, MD, Joy Wallenberg, MD, Brian Weinshenker, MD, and Ernest Willoughby, MD

Regular Departments

122nd Annual Meeting of the American Neurological Association
383 **Program**
390 **Abstracts**
26th Annual Meeting of the Child Neurology Society
475 **Program**
489 **Abstracts**

NO 4 OCTOBER 1997

Editorials

539 **Noninvasive Imaging of the Ischemic Penumbra**
Howard A. Rowley, MD

541 **Neurodegenerative Diseases with Cytoskeletal Pathology: A Biochemical Classification**
Dennis W. Dickson, MD

Neurological Progress

545 **Melatonin: A Clinical Perspective**
Plamen D. Penev, MD, PhD, and Phyllis C. Zee, MD, PhD

Original Articles

554 **Functional and Metabolic Analysis of Cerebral Ischemia Using Magnetoencephalography and Proton Magnetic Resonance Spectroscopy**
Kyousuke Kamada, MD, PhD, Mark Saguer, MD, Martin Möller, MD, Karsten Wicklow, PhD, Martin Katenhäuser, PhD, Helmut Kober, PhD, and Jürgen Vieth, MD

564 **Autosomal Dominant Dementia with Widespread Neurofibrillary Tangles**
Lee A. Reed, MD, Thomas J. Grabowski, MD, Marie Luise Schmidt, PhD, John C. Morris, MD, Alison Goate, DPhil, Ana Solodkin, PhD, Gary W. Van Hoesen, PhD, Robert L. Schelper, MD, PhD, Chris J. Talbot, PhD, Michelle A. Wragg, PhD, and John Q. Trojanowski, MD, PhD

573 **In Vivo Skeletal Muscle Mitochondrial Function in Leber's Hereditary Optic Neuropathy Assessed by ^{31}P Magnetic Resonance Spectroscopy**
R. Lodi, MD, D. J. Taylor, PhD, S. J. Tabrizi, MRCP, S. Kumar, MD, M. Sweeney, BSc, N. W. Wood, MD, P. Styles, PhD, G. K. Radda, FRS, and A. H. V. Schapira, MD

580 **A Bcl-2 Antisense Oligonucleotide Increases α-Amino-3-Hydroxy-5-Methylisoxazole-4-Propionic Acid (AMPA) Toxicity in Cortical Cultures**
Melissa J. White, BS, Jun Chen, MD, PhD, R. Li Zhu, MD, Stacy Irvin, BS, Amy Sinor, BA, Michael J. DiCaprio, BS, Kunlin Jin, MD, PhD, and David A. Greenberg, MD, PhD

588 **Central Apnea and Acute Cardiac Ischemia in a Sheep Model of Epileptic Sudden Death**
S. Claiborne Johnston, MD, MPH, Ralf Siedenberg, MD, Jeffrey K. Min, BA, E. Heidi Jerome, MD, and Kenneth D. Laxer, MD

595 **Monoclonal Antibodies to Purified Cortical Lewy Bodies Recognize the Mid-Size Neurofilament Subunit**
James E. Galvin, MD, MSc, Virginia M.-Y. Lee, PhD, Minami Baba, BSc, David M. A. Mann, PhD, Dennis W. Dickson, MD, Hisako Yamaguchi, MSc, M. Luise Schmidt, PhD, Takeshi Iwatsubo, MD, PhD, and John Q. Trojanowski, MD, PhD

604 **Huntingtin Localization in Brains of Normal and Huntington's Disease Patients**
E. Sapp, BA, C. Schwarz, MS, K. Chase, BS, P. G. Bhide, PhD, A. B. Young, MD, PhD, J. Penney, MD, J. P. Vonsattel, MD, N. Aronin, MD, and M. DiFiglia, PhD

613 **Prospective Study of Neurological Responses to Treatment with Macrophage-Targeted Glucocerebrosidase in Patients with Type 3 Gaucher's Disease**
Raphael Schiffmann, MD, Melvyn P. Heyes, PhD, J. M. Aerts, PhD, James M. Dambrosia, PhD, Marc C. Patterson, MD, Thomas DeGraba, MD, Colette C. Parker, MD, Gregory C. Zirzow, BS, Katherine Oliver, MS, Gioacchino Tedeschi, MD, Roscoe O. Brady, MD, Norman W. Barton, MD, PhD, and Collaborators

622 **Magnetoencephalography in Partial Epilepsy: Clinical Yield and Localization Accuracy**
R. C. Knowlton, MD, K. D. Laxer, MD, M. J. Aminoff, MD, T. P. L. Roberts, PhD, S. T. C. Wong, PhD, and H. A. Rowley, MD

632 **Functional Magnetic Resonance Imaging of Single Motor Events Reveals Human Presupplementary Motor Area**
Miles Humberstone, MB, Guy V. Sawle, DM, Stuart Clare, BSc, Jonathan Hykin, MB, Ronald Coxon, PhD, Richard Bowtell, PhD, Ian A. Macdonald, PhD, and Peter G. Morris, PhD

638 **Familial Parkinsonism, Dementia, and Lewy Body Disease: Study of Family G**
Melody A. Denson, MD, Zbigniew K. Wszolek, MD, Ronald F. Pfeiffer, MD, Elzbieta K. Wszolek, MD, Tanya M. Paschall, BA, and Rodney D. McComb, MD

644 **Increased 3-Nitrotyrosine in Both Sporadic and Familial Amyotrophic Lateral Sclerosis**
M. Flint Beal, MD, Robert J. Ferrante, PhD, Susan E. Browne, PhD, Russell T. Matthews, BS, Neil W. Kowall, MD, and Robert H. Brown, Jr, MD

Brief Communications

655 **Modulation of the Age at Onset of Parkinson's Disease by Apolipoprotein E Genotypes**
Sepideh Zareparsi, MS, Jeffrey Kaye, MD, Richard Camicioli, MD, Holly Grimslid, BS, Barry Oken, MD, Michael Litt, PhD, John Nutt, MD, Thomas Bird, MD, Gerard Schellenberg, PhD, and Haydeh Payami, PhD

659 **Apolipoprotein E–Associated Risk for Alzheimer's Disease in the African-American Population Is Genotype Dependent**
Amrik Sahota, PhD, Min Yang, MS, Sujuan Gao, PhD, Siu L. Hui, PhD, Olusegun Baiyewu, MBBS, Oyewusi Gureje, MBBS, Steven Oluwole, MBBS, Adesola Ogunniyi, MB, ChB, Kathleen S. Hall, PhD, and Hugh C. Hendrie, MB, ChB

661 **New Familial Mitochondrial Encephalopathy with Macrocephaly, Cardiomyopathy, and Complex I Deficiency**
C. Dionisi-Vici, MD, W. Ruitenbeek, PhD, G. Fariello, MD, H. Bentlage, PhD, R. J. A. Wanders, PhD, H. Schägger, PhD, C. Bosman, MD, C. Piantadosi, MD, G. Sabetta, MD, and E. Bertini, MD

666 **Altered Serotonin Synthesis in the Dentatothalamocortical Pathway in Autistic Boys**
Diane C. Chugani, PhD, Otto Muzik, PhD, Robert Rothermel, PhD, Michael Behen, BA, Pulak Chakraborty, PhD, Thomas Mangner, PhD, Ednéa A. da Silva, MD, and Harry T. Chugani, MD

670 **Idiopathic Torsion Dystonia Linked to Chromosome 8 in Two Mennonite Families**
L. Almasy, PhD, S. B. Bressman, MD, D. Raymond, MS, P. L. Kramer, PhD, P. E. Greene, MD, G. A. Heiman, MS, B. Ford, MD, J. Yount, BA, D. de Leon, MS, S. Chouinard, MD, R. Saunders-Pullman, MD, M. F. Brin, MD, R. P. Kapoor, MD, A. C. Jones, MD, H. Shen, MD, S. Fahn, MD, N. J. Risch, PhD, and T. G. Nygaard, MD

Regular Departments

674 **Books**

NO 5 NOVEMBER 1997

Editorial

675 **Measuring the "Viral Load" in Cerebrospinal Fluid in Human Immunodeficiency Virus Infection: Window into Brain Infection?**
Richard W. Price, MD, and Silvija Staprans, PhD

Original Articles

679 **Cerebrospinal Fluid Human Immunodeficiency Virus Type 1 RNA Levels Are Elevated in Neurocognitively Impaired Individuals with Acquired Immunodeficiency Syndrome**
Ronald J. Ellis, MD, PhD, Karen Hsia, PhD, Stephen A. Spector, MD, Julie A. Nelson, BS, Robert K. Heaton, PhD, Mark R. Wallace, MD, Ian Abramson, PhD, J. Hampton Atkinson, MD, Igor Grant, MD, J. Allen McCutchan, MD, and the HIV Neurobehavioral Research Center Group

689 **Relationship Between Human Immunodeficiency Virus–Associated Dementia and Viral Load in Cerebrospinal Fluid and Brain**
Justin C. McArthur, MBBS, MPH, Daniel R. McClernon, BS, Michael F. Cronin, MS, Tish E. Nance-Sproson, MHA, Alfred J. Saah, MD, Marty St Clair, BS, and E. Randall Lanier, PhD

699 **Long-Term Stroke Risk in Children with Sickle Cell Disease Screened with Transcranial Doppler**
R. J. Adams, MD, V. C. McKie, MD, E. M. Carl, BA, F. T. Nichols, MD, R. Perry, PhD, K. Brock, RN, K. McKie, MD, R. Figueroa, MD, M. Litaker, PhD, S. Weiner, MS, and D. Brambilla, PhD

705 **Ontogeny of Ipsilateral Corticospinal Projections: A Developmental Study with Transcranial Magnetic Stimulation**
K. Müller, MD, F. Kass-Iliyya, MD, and M. Reitz, MD

712 **Differential Distribution of the Normal and Mutated Forms of Huntingtin in the Human Brain**
Isabelle Gourfinkel-An, MD, Géraldine Cancel, BS, Yvon Trottier, PhD, Didier Devys, PhD, Laszlo Tora, PhD, Yves Lutz, PhD, Georges Imbert, BS, Frédéric Saudou, PhD, Giovanni Stevanin, BS, Yves Agid, MD, PhD, Alexis Brice, MD, Jean-Louis Mandel, MD, PhD, and Etienne C. Hirsch, PhD

720 **Alterations in Opioid Receptor Binding in Parkinson's Disease Patients with Levodopa-Induced Dyskinesias**
P. Piccini, R. A. Weeks, and D. J. Brooks

727 **Long-Term Effects of Pancreatic Transplantation on Diabetic Neuropathy**
Xavier Navarro, MD, PhD, David E. R. Sutherland, MD, PhD, and William R. Kennedy, MD

737 **Proton Magnetic Resonance Spectroscopic Imaging and Magnetic Resonance Imaging Volumetry in the Lateralization of Temporal Lobe Epilepsy: A Series of 100 Patients**
Fernando Cendes, MD, PhD, Zografos Caramanos, MA, Frederick Andermann, MD, François Dubeau, MD, and Douglas L. Arnold, MD

747 **Entacapone Improves Motor Fluctuations in Levodopa-Treated Parkinson's Disease Patients**
Parkinson Study Group

756 **Quantitative Neuropathology and Quantitative Magnetic Resonance Imaging of the Hippocampus in Temporal Lobe Epilepsy**
W. Van Paesschen, PhD, T. Revesz, MRCPath, J. S. Duncan, FRCP, M. D. King, PhD, and A. Connelly, PhD

767 **Effects of Apomorphine on Globus Pallidus Neurons in Parkinsonian Patients**
W. D. Hutchison, PhD, R. Levy, BSc, J. O. Dostrovsky, PhD, A. M. Lozano, MD, PhD, and A. E. Lang, MD

776 **Dietary Fat Intake and the Risk of Incident Dementia in the Rotterdam Study**
Sandra Kalmijn, MD, Lenore J. Launer, PhD, Alewijn Ott, MD, Jacqueline C. M. Witteman, PhD, Albert Hofman, MD, and Monique M. B. Breteler, MD

783 **Inflammatory Central Nervous System Demyelination: Correlation of Magnetic Resonance Imaging Findings with Lesion Pathology**
Wolfgang Brück, MD, Andreas Bitsch, MD, Herbert Kolenda, MD, Yvonne Brück, MD, Michael Stiefel, MD, and Hans Lassman, MD

Brief Communications

794 **Localization of Frontotemporal Dementia with Parkinsonism in an Australian Kindred to Chromosome 17q21–21**
Matt Baker, BSc, John B. J. Kwok, PhD, Steve Kucera, PhD, Richard Crook, BSc, Matthew Farrer, PhD, Henry Houlden, MD, Adrian Isaacs, Sarah Lincoln, BSc, Luisa Onstead, BSc, John Hardy, PhD, Leonie Wittenberg, BSc, Peter Dodd, PhD, Sonja Webb, BSc,Nick Hayward, PhD, Tony Tannenberg, MB, BS, FRCPA, Athena Andreadis, PhD, Marianne Hallupp, BSc, Peter Schofield, PhD, Frances Dark, MD, and Michael Hutton, PhD

799 **Clinical and Magnetic Resonance Imaging Findings in Batten Disease: Analysis of the Major Mutation (1.02-kb Deletion)**
Irma Järvelä, MD, PhD, Taina Autti, MD, Sirkka Lamminranta, MSc, Laura Åberg, MD, Raili Raininko, MD, and Pirkko Santavuori, MD

803 **Copper/Zinc Superoxide Dismutase 1 and Sporadic Amyotrophic Lateral Sclerosis: Analysis of 155 Cases and Identification of a Novel Insertion Mutation**
Mandy Jackson, BSc, Ammar Al-Chalabi, MRCP, Zinat E. Enayat, BSc, Barry Chioza, MSc, Peter N. Leigh, FRCP, and Karen E. Morrison, DPhil

807 **Pallidotomy for Hemiballismus: Efficacy and Characteristics of Neuronal Activity**
J. I. Suarez, MD, L. Verhagen Metman, MD, S. G. Reich, MD, P. M. Dougherty, PhD, M. Hallett, MD, and F. A. Lenz, MD, PhD

811 **A Novel Muscle Sodium Channel Mutation Causes Painful Congenital Myotonia**
Jeffrey Rosenfeld, MD, PhD, Karen Sloan-Brown, BS, and Alfred L. George, Jr, MD

Letters

815 **SMI-31 Immunoreactivity in Inclusion Body Myositis**
Simone Spuler, MD, and Andrew G. Engel, MD

815 **Reply**
Valerie Askanas, MD, PhD, Renate B. Alvarez, MSc, Massimiliano Mirabella, MD, and W. King Engel, MD

815 **Clinically Definite Multiple Sclerosis Following Optic Neuritis**
Roy W. Beck, MD, PhD

816 **Reply**
Lawrence D. Jacobs, MD, Samer E. Kaba, MD, Colleen M. Miller, RN, CNS, Roger L. Priore, ScD, and Carol M. Brownscheidle, PhD

Regular Departments

816 **Correction**
817 **Books**

NO 6 DECEMBER 1997

Neurological Progress

819 **Aging and the Brain: A New Frontier**
David A. Drachman, MD

Original Articles

829 **Presurgical Multimodality Neuroimaging in Electroencephalographic Lateralized Temporal Lobe Epilepsy**
Robert C. Knowlton, MD, Kenneth D. Laxer, MD, Gabriele Ende, PhD, Randall A. Hawkins, MD, PhD, Stephen T. C. Wong, PhD, Gerald B. Matson, PhD, Howard A. Rowley, MD, George Fein, PhD, and Michael W. Weiner, MD

838 **Inhibition of Axonal Growth from Sensory Neurons by Excess Nerve Growth Factor**
Anna M. Conti, MD, Stephanie J. Fischer, BA, and Anthony J. Windebank, MD

847 **Human Immunodeficiency Virus Type 1 and Its Coat Protein gp120 Induce Apoptosis and Activate JNK and ERK Mitogen-Activated Protein Kinases in Human Neurons**
Annie Lannuzel, Jean Vianney Barnier, Christiane Hery, Huynh Van Tan, Bernard Guibert, Françoise Gray, Jean Didier Vincent, and Marc Tardieu

857 **A Randomized Trial of Anticoagulants Versus Aspirin after Cerebral Ischemia of Presumed Arterial Origin**
The Stroke Prevention In Reversible Ischemia Trial (SPIRIT) Study Group

866 **Correlation Between PMP-22 Messenger RNA Expression and Phenotype in Hereditary Neuropathy with Liability to Pressure Palsies**
Angelo Schenone, MD, Lucilla Nobbio, PhD, Claudia Caponnetto, MD, Michele Abbruzzese, MD, Paola Mandich, MD, Emilia Bellone, PhD, Franco Ajmar, MD, Gianfranco Gherardi, Anthony J. Windebank, MD, and Gianluigi Mancardi, MD

873 **Outcome after Temporal Lobectomy in Bilateral Temporal Lobe Epilepsy**
Joseph I. Sirven, MD, Barbara L. Malamut, PhD, Joyce D. Liporace, MD, Michael J. O'Connor, MD, and Michael R. Sperling, MD

879 **Spinocerebellar Ataxia Type 6: CAG Repeat Expansion in α_{1A} Voltage-Dependent Calcium Channel Gene and Clinical Variations in Japanese Population**
Takeshi Ikeuchi, MD, Hiroki Takano, MD, Reiji Koide, MD, Yoh Horikawa, MD, Yoshiaki Honma, MD, Yoji Onishi, MD, Shuichi Igarashi, MD, Hajime Tanaka, MD, Naoki Nakao, MD, Ko Sahashi, MD, Hiroshi Tsukagoshi, MD, Kiyoharu Inoue, MD, Hitoshi Takahashi, MD, and Shoji Tsuji, MD

885 **Mapping of a Second Locus for Familial Hemiplegic Migraine to 1q21-q23 and Evidence of Further Heterogeneity**
Anne Ducros, MD, Anne Joutel, MD, PhD, Katayoun Vahedi, MD, Michaëlle Cecillon, Antonio Ferreira, MD, Evelyne Bernard, MD, Albert Verier, MD, Bernard Echenne, MD, Adolfo Lopez de Munain, MD, Marie-Germaine Bousser, MD, and Elisabeth Tournier-Lasserve, MD

891 **Unilateral Cerebellar Lesions Affect Initiation of Ipsilateral Smooth Pursuit Eye Movements in Humans**
A. Straube, MD, W. Scheuerer, MD, and T. Eggert, PhD

899 **Amyloid β-Protein Deposition in the Leptomeninges and Cerebral Cortex**
Yasuhisa Shinkai, MD, Masahiro Yoshimura, MD, Maho Morishima-Kawashima, PhD, Yuji Ito, MD, Hiroyuki Shimada, MD, Katsuhiko Yanagisawa, MD, and Yasuo Ihara, MD

909 **Butyrylcholinesterase in the Life Cycle of Amyloid Plaques**
A. L. Guillozet, BA, J. F. Smiley, PhD, D. C. Mash, PhD, and M.-M. Mesulam, MD

919 **A Triethnic Comparison of Intracerebral Hemorrhage Mortality in Texas**
Lewis B. Morgenstern, MD,andWilliam D. Spears, PhD

924 **Autosomal Dominant Cerebellar Ataxia: Phenotypic Differences in Genetically Defined Subtypes?**
Ludger Schöls, MD, Georgios Amoiridis, MD, Thomas Büttner, MD, Horst Przuntek, MD, Jörg T. Epplen, MD, and Olaf Riess, MD

933 **Spinocerebellar Ataxia Type 6: Gaze-Evoked and Vertical Nystagmus, Purkinje Cell Degeneration, and Variable Age of Onset**
Christopher M. Gomez, MD, PhD, Randall M. Thompson, BS, Jason T. Gammack, BS, Susan L. Perlman, MD, William B. Dobyns, MD, Charles L. Truwit, MD, David S. Zee, MD, H. Brent Clark, MD, PhD, and John H. Anderson, MD, PhD

951 **Morphometry of In Vivo Human White Matter Association Pathways with Diffusion-Weighted Magnetic Resonance Imaging**
N. Makris, MD, A. J. Worth, PhD, A. G. Sorensen, MD, G. M. Papadimitriou, BS, O. Wu, MS, T. G. Reese, PhD, V. J. Wedeen, MD, T. L. Davis, MD, J. W. Stakes, MD, V. S. Caviness, MD, DPhil, E. Kaplan, PhD, B. R. Rosen, MD, PhD, D. N. Pandya, MD, and D. N. Kennedy, PhD

963 **Dendritic Injury Is a Pathological Substrate for Human Immunodeficiency Virus–Related Cognitive Disorders**
Eliezer Masliah, MD, Robert K. Heaton, PhD, Thomas D. Marcotte, PhD, Ronald J. Ellis, MD, PhD, Clayton A. Wiley, MD, PhD, Margaret Mallory, BS, Cristian L. Achim, MD, J. Allen McCutchan, MD, Julie A. Nelson, BA, J. Hampton Atkinson, MD, Igor Grant, MD, and the HNRC Group

Brief Communications

973 **Treatment of Gustatory Sweating with Botulinum Toxin**
Markus Naumann, MD, Max Zellner, MD, Klaus V. Toyka, MD, and Karlheinz Reiners, MD

975 **Are Portable Folding Chairs Useful to Combat Orthostatic Hypotension?**
Adrianus A. J. Smit, MD, Mireille A. Hardjowijono, MSc, and Wouter Wieling, MD, PhD

978 **Decreased Cerebrospinal Fluid Levels of Substance P in Patients with Rett Syndrome**
Toyojiro Matsuishi, MD, Shinichiro Nagamitsu, MD, Yushiro Yamashita, MD, Yoshihiko Murakami, MD, Akihiko Kimura, MD, Tetsuo Sakai, MD, Hiroshi Shoji, MD, Hirohisa Kato, MD, and Alan K. Percy

Letters

982 **Ibuprofen Does Not Suppress Active Multiple Sclerosis Lesions on Gadolinium-Enhanced MR Images**
Frederik Barkhof, MD, Jan-Hein T. M. van Waesberghe, MD, Bernard M. J. Uitdehaag, MD, and Chris H. Polman, MD

982 **Application of the Poser Criteria in Primary Progressive Multiple Sclerosis**
G. V. McDonnell, MRCP, and S. A. Hawkins, FRCP

983 **Cortical Matching of Visual and Vestibular 3D Coordinate Maps**
Thomas Brandt, MD

984 **Multiple Sclerosis and Retroviruses**
Michel Brahic, MD, PhD, and Jean-Francois Bureau, MD, PhD

Regular Departments

986 **American Neurological Association, Works in Progress Abstracts**

Indexes to Volume 42

989 **Author Index**
1001 **Subject Index**